ENCLOSURE 13

EMT In-Course Written Examination Blueprint

The EMT course requires a written examination after completion of each module of instruction as well as a final comprehensive written examination.

The training institution (EMT Program Coordinator) and/or the primary (lead) course instructor is responsible for the construction and administration of these examinations.

In order to provide some standardization statewide to these in-course written examinations, the following guidelines must be observed:

- **Follow the exam blueprint as outlined for the format of each examination.**
- **Utilize the computer test bank prepared by the publisher of the textbook in use for selecting questions for the seven (7) module examinations as well as the final comprehensive examination.**
- **All questions should be of the multiple choice kind, or a mixture of multiple choice and matching.**
- **Examinations are to be timed not to exceed one (1) minute per question.**

You may change the questions in each examination for each course/class as often as you wish so long as you follow the format and guidelines as indicated.

Any daily quizzes are an option and the sole responsibility of the instructor. Types of questions may vary according to the needs of the instructor.

EXAM BLUEPRINT

The following blueprint is to be used for each of the module examinations. The number(s) of questions from each lesson/module is based upon % of total objectives for the module. You may select the number of total questions per examination from the options provided.

MODULE 1 (91 OBJECTIVES)	25 QUESTION EXAMINATION	50 QUESTION EXAMINATION	% OF TOTAL OBJECTIVES
LESSON 1-1	2	5	9.8
LESSON 1-2	4	7	14.2
LESSON 1-3	4	8	16.4
LESSON 1-4	1	2	2.1
LESSON 1-5	10	20	40.6
LESSON 1-6	4	8	16.4

MODULE 2 (43 OBJECTIVES)	10 QUESTION EXAMINATION	15 QUESTION EXAMINATION	% OF TOTAL OBJECTIVES
LESSON 2-1	10	15	100%

MODULE 3 (89 OBJECTIVES)	25 QUESTION EXAMINATION	50 QUESTION EXAMINATION	% OF TOTAL OBJECTIVES
LESSON 3-1	3	5	10.1
LESSON 3-2	7	16	31.4
LESSON 3-3	2	4	8.9
LESSON 3-4	2	4	7.8
LESSON 3-5	2	4	6.7
LESSON 3-6	2	4	7.8
LESSON 3-7	4	7	14.6
LESSON 3-8	3	6	12.3

MODULE 4 (166 OBJ)	25 QUESTION EXAMINATION	50 QUESTION EXAMINATION	75 QUESTION EXAMINATION	% OF TOTAL OBJECTIVES
LESSON 4-1	1	2	4	4.8
LESSON 4-2	2	4	6	8.4
LESSON 4-3	8	16	24	32.5
LESSON 4-4	2	3	5	6.0
LESSON 4-5	2	4	6	7.8
LESSON 4-6	2	5	7	9.0
LESSON 4-7	2	4	5	7.2
LESSON 4-8	2	3	5	6.6
LESSON 4-9	4	9	13	17.4

MODULE 5 (114 OBJECTIVES)	25 QUESTION EXAMINATION	50 QUESTION EXAMINATION	% OF TOTAL OBJECTIVES
LESSON 5-1	4	8	14.9
LESSON 5-2	9	18	35.9
LESSON 5-3	3	5	10.5
LESSON 5-4	9	19	38.5

MODULE 6 (26 OBJECTIVES) (7 HOURS)	10 QUESTION EXAMINATION	15 QUESTION EXAMINATION	% OF TOTAL OBJECTIVES
LESSON 6-1	10	15	100%

MODULE 7 (38 OBJECTIVES)	10 QUESTION EXAMINATION	15 QUESTION EXAMINATION	% OF TOTAL OBJECTIVES
LESSON 7-1	4	6	42.1
LESSON 7-2	2	3	18.4
LESSON 7-3	4	6	39.4

FINAL COMPREHENSIVE WRITTEN EXAMINATION (25% OF FINAL GRADE)					
MODULE	**75 QUES EXAM**	**100 QUES EXAM**	**125 QUES EXAM**	**150 QUES EXAM**	**% OF TOT Questions**
1	12	16	20	24	16.0
2	6	7	9	11	7.5
3	12	16	20	24	15.6
4	22	29	37	44	29.2
5	15	20	25	30	20.1
6	3	5	6	7	4.8
7	5	7	8	10	6.7

Determining a Candidate's Final Grade

Each candidate in an Initial EMT course must have a grade in each of the seven (7) modules, plus a final written examination grade. The seven module exams *(plus the grade for the CPR course as well as the average quiz grade if used)* count as 75% and the final comprehensive written examination counts as 25% of the total grade.

Example: Candidate *"JS"*

Module 1: ***77***
Module 2: ***81***
Module 3: ***67***
Module 4: ***87***
Module 5: ***71***
Module 6: ***59***
Module 7: ***93***
CPR Course (Optional): - ***N/A Not Used***
Average Quiz Grade (Optional): - ***N/A Not Used***
Final Comprehensive Written Examination: ***88***

Add up the grades for Modules 1 through 7: The total is ***535***
Divide that total (***535***) by the total number of grades (In this case - ***7***) (535 / 7 = ***76.4***)
NOTE: if you include the grades for the CPR course and the average quiz grade – then you will divide the total number by nine (9).

This grade counts as 75% of the total - so list that grade 3 times (which will equal 75%). Then list the final written examination grade of (***88***) once (which will equal 25%) and then divide that total (***317.2***) by 4 (the total number of grades – and that will give you the final course grade. See example below.

76.4 + 76.4 +76.4 + 88 = 317.2
317.2 **-** Divided by 4 = ***79.3***

Therefore, the final course grade for Candidate *"JS"* is a **79**

Module 1	Module 2	Module 3	Module 4	Module 4	Module 6	Module 7	Final Writ.	Final In-Course Practical	Clinical	**Final Course Grade**
77	***81***	***67***	***87***	***71***	***59***	***93***	***88***	***Pass or Fail***	***Pass or Fail***	***79***
CPR Course	Avg Quiz					Avg Module Grade				
N/A	N/A					***76.4***				

Be sure to place each grade in the appropriate space on the *Certificate Application* "White" card – as noted above in the example.

For an EMT *"Refresher"* candidate – that candidate will only have one written grade (the final comprehensive written grade). That grade will also become the final course grade.

Refresher Course Grades		
Final Written Exam	***Final (In-Course) Practical Exam***	***Final Course Grade***
85	***Pass or Fail***	***85***

In the example above, the refresher candidate made an ***85*** on the final written comprehensive examination. That same grade also becomes his/her final course grade.

NOTE: All candidates (initial or refresher) must pass the in-course practical examination to the satisfaction of the instructor. If a candidate (initial or refresher) fails the in-course practical examination (or – if an initial candidate fails to successfully complete the clinical requirements) – that candidate will then fail the course regardless of the written grade.

TEST CONSTRUCTION GUIDELINES

The ability to construct good test questions for EMTs is a unique skill that many EMS educators do not possess. The process requires extensive knowledge of the curricula, available textbook(s), and a solid foundation in the "street-level" practice of emergency medical technicians.

Although experience in writing test items is helpful, bad habits become rooted and must be corrected. Creativity combined with grammar, syntax, and a strong foundation in clinical knowledge is essential in constructing successful test items.

The following guidelines are designed to help you understand the basic principles of item writing.

MULTIPLE CHOICE QUESTIONS

Multiple choice questions are, by far, the most popular form of written examinations. A multiple choice question consist of three distinct parts:

- One (1) stem (question)
- One (1) correct answer
- Two (2) to four (4) distracters (plausible answers)

All examples in this enclosure will consist of the stem, correct answer, and three (3) distracters in that order – meaning the "correct" answer will be list as "A".

1. All items should be directly referenced to the objectives in the curricula. The reference may be placed on the line directly above the item or kept under separate cover.

   Example 1: **Reference of an objective**

   1-3.3
   When a victim is unresponsive or so ill or badly injured that his/her judgment is impaired, the EMT should assume that the victim desires treatment and transport. The legal basis for this action is known as:

   A. Implied consent
   B. Expressed consent

C. Informed consent
D. Duty to act

The reference indicates that this item is referenced to **Module 1, Lesson 3, Objective 3** of the 1994 DOT National Standard Curriculum for EMT-Basic.

2. The stem should be clear, direct, concise, and contain all pertinent information necessary for the student to make an accurate determination.

Example 2: **Invalid stem**

1-3.3
When a patient is injured or ill, the EMT can assume that the patient desires treatment. This is called:

A. Implied consent
B. Expressed consent
C. Informed consent
D. Duty to act

Compare the above stem with that in Example 1. The above stem does not give enough information about the patient for the student to discriminate between the various types of consent. The stem is vague and does not produce the desired result from the student. It is therefore invalid and unacceptable in its present state.

3. All items must have one and only one correct answer or best choice. All distracters (incorrect answers) must be plausible. They must be clear, realistic, and provide the basis for a possible correct answer.

Look again at Example 1. Notice how all distracters (incorrect answers) are actual types of consent or legal obligations associated with consent.

1-3.3
When a victim is unresponsive or so ill or badly injured that his/her judgment is impaired, the EMT should assume that the victim desires treatment and transport. The legal basis for this action is known as:

A. Implied consent
B. Expressed consent
C. Informed consent
D. Duty to act

This forces the student to discriminate between the various types of consent in order to select the most appropriate answer. A candidate with less than the minimal knowledge base would be capable of selecting a wrong response.

All distracters should have some degree of plausibility. Distracters that are not relevant do not measure or distinguish among different levels of candidate knowledge. Each distracter should be attractive to at least some candidates.

Now, look at the following examples of unacceptable distracters:

Example 3: **Invalid distracters**

1-3.3
When a victim is unresponsive or so ill or badly injured that his/her judgment is impaired, the EMT should assume that the victim desires treatment and transport. The legal basis for this action is known as:

A. Implied consent
B. Replied consent
C. Applied consent
D. Regulation 61-7

Distracters B and C are not realistic or plausible since they do not actually exist. Making distracters rhyme with the correct response causes weak students to become confused and literally creates "mental havoc" in students with a learning disability in reading comprehension. These types of distracters are unfair and invalid. They have no place in an examination.

Distracter D is likewise unacceptable because the distracter does not deal with the laws of consent. The distracter is misleading in that is causes a weak student to associate the laws of consent with legal regulations associated with the practices of emergency medical services.

Example 4: **Ridiculous distracters**

3-2.2
You are standing in line at a crowded bank when the man directly in front of you collapses. Your next action should be to:

A. Assess patient's mental status
B. Step over the man to retain your place in the line

C. Take his money and run
D. Change to another line and pretend you didn't see him

These types of distracters not only give the correct answer away, but also insult the candidate. This shows no respect for the candidate's ability to store and utilize information in a logical and productive manner.

4. Here are some other tips on creating good, solid test items:

A. Try to avoid questions that require terms, definitions of terms, or numbers as the correct response. While some of these types of questions may be necessary, most is not. Select and limit these types of questions carefully. The majority of these questions do nothing but test rote memory. Rote memory is nothing more than an unthinking regurgitation of subject matter and does not allow the candidate to use comprehension skills.

B. Construct items that test candidates at a higher level than the face value of the objective. The item should allow the candidate to apply, evaluate, and discriminate knowledge rather than to define, describe, or recite knowledge.

C. Construct items in a scenario form when possible. This will allow the candidate an opportunity to place himself/herself within the action of the question and consolidate and process knowledge into a response. This will also let the instructor know if the candidate is able to correctly put to use acquired knowledge into a practical and definitive response that will be in the best interest of the patient.

D. Keep in mind your experiences as an EMT. They are a valuable asset in determining what the candidate "needs to know" vs. what is "fluff" or "nice to know".

E. Keep the stem free from irrelevant material. Stems that require more than six (6) lines are discouraged.

Example 5: **Extraneous material**

5-1.3
In the control of external bleeding, the EMT must be able to distinguish between arterial bleeding (bright red, spurting blood) and venous bleeding (dark red, oozing blood). Treatment of external bleeding is important in order to keep the victim from going into shock (hypo perfusion). The first step to controlling external bleeding should be to:

A. Apply (gloved) fingertip pressure directly to the site
B. Elevate the bleeding extremity while keeping the victim warm
C Apply a tourniquet to the upper portion of the extremity
D. Apply direct pressure to the arterial pressure point

The first sentence of the above stem is irrelevant material and should be deleted. The second sentence of the stem is also irrelevant and only used to "teach" the candidate. Using the stem to "teach" the candidate is inappropriate for an examination. All such material should be cleaned out of the stem.

With all the extraneous material deleted, the example (as listed below) should now be acceptable.

5-1.3
The first step to controlling external bleeding should be to:

A. Apply (gloved) fingertip pressure directly to the site
B. Elevate the bleeding extremity while keeping the victim warm
C Apply a tourniquet to the upper portion of the extremity
D. Apply direct pressure to the arterial pressure point

Remember to be concise. The object is to test relevant knowledge and not to teach or serve as an exercise in extensive reading.

F. Try to avoid stems stated in negative terms. However, if using "not" or "except," they should be placed in **bold** type, <u>underlined</u>, or **<u>both</u>**.

G. It is best NOT to use the distracters "all of the above" and/or "none of the above." If you do use these, do not always make the correct answer that response.

H. Items such as "multiple-multiples," or "compound-multiples" are discouraged. These questions are actually four questions in one. They are more of an exercise in reading than a determination of knowledge. Although reading is an essential skill of the EMT, reading is a skill that can be adequately and fairly evaluated through concise test items.

I. Evenly distribute the correct response among the distracters. Do not always make the correct answer option "C" or have strings of several correct answers as the same option.

J. The length of the alternatives should not provide a clue to the answer. Keep all distracters as close to the same length as possible. You may, however, have two long and two short responses.

(Often the longest or shortest response is the correct answer. Monitor your test items to avoid a distracter that is very different in length from the other alternatives).

K. Avoid using distracters or stems that include the words "never" and/or "always."

5. Write your test items early. Put the items away for a few days and go back and re-read the test for quality compliance and validity. A good, well-written test is developed over a period of days and weeks, NOT hours.

6. Allow your peers to "preview" your test. They will often find misleading, unclear, vague, and poorly written stems and distracters that may have eluded you in several readings.

7. Finally, keep a record of how many students get each question right or wrong. Also keep a record of how often each of the wrong responses was chosen and which of three groups of students chose that response.

   Candidates are classified into one of three groups: The upper third, the middle third, and the lower third of a specific class or number of students being measured - such as:

   The last (X) - number of months of candidates
   The last (X) - number of candidates
   The last class of candidates

   If more students from the lower third of the group get specific questions right while students from the upper third get the same questions wrong, then there may be a problem with the construction of the test item or its relationship to the objective being tested.

LEARNING DOMAINS

The 1994 EMT-Basic curriculum contains objectives for each of three learning domains: Cognitive, Affective, and Psychomotor. Each domain requires specific item construction to accurately reflect the intent of the objective.

Cognitive Objective Question:

2-1.5
You respond to the scene of a head-on motor vehicle accident and find your patient unresponsive in the vehicle. How should you open the airway to check for breathing?

A. Jaw-thrust maneuver
B. Head-tilt chin-lift maneuver
C. Head-tilt neck-lift maneuver

D. Sniffing position maneuver

Affective Objective Question:

2-1.23
Which of the following treatments receives preference in a victim involved in a head-on motor vehicle accident.

A. Establishing an open airway
B. Control of major bleeding
C. Protection of the cervical spine
D. Application of high-flow oxygen

Psychomotor Objective Question:

2-1.25
When opening the airway of a victim involved in a head-on motor vehicle accident, you should:

A. Place one hand on each side of the victim's jaw and push the angles of the jaw forward
B. Place one hand on the victim's forehead and press down while lifting the victim's chin
C. Place one hand on the victim's forehead and press down while lifting the victim's neck
D. Place one hand on each side of the victim's head and rotate the head downward and inward

Note the differences in the distracters of each question, particularly between the cognitive and psychomotor questions. In the psychomotor question you are evaluating whether or not the candidate can determine the correct psychomotor steps involved in opening the airway of a trauma victim and not if the candidate can recognize the proper method (term) for the same procedure as in the cognitive question.

Evaluate your test items to determine that the question reflects the intent of the objective in the proper learning domain.

This enclosure is only the beginning in understanding the fundamental concepts of item construction. Much study and research is necessary to understanding the processes of item evaluation such as exam analysis, reliability and validity. The individual responsible for test construction is encouraged to seek out other resources on the subject.